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Population build up of paddy yellow stem borer (*Scirpophaga incertulus* Walker) in relation to different weather parameters

Rice (*Oryza sativa* L.) is one of the major staple food crops for more than half of the world's population and being grown worldwide. Among several insects that feed on rice, the extent of damage caused by stem borer varied from 80 to 97 per cent (Sharma *et al.,* 1996). Stem borers are considered as the most important in general, the yellow stem borer, *Scirpophaga incertulas* (Walker) and *S. innotata* (Walker) in particular. It is considered as the serious and specific pest of irrigated and low land rice that caused heavy yield loss (Singh *et al.,* 2005). It causes dead hearts during vegetative growth stage and white ear heads during reproductive stage. Therefore, study was conducted to know the seasonal incidence and its relationship with weather parameters on peak emergence of moth in rainfed rice growing ecosystems of Uttara Kannada district.

The present investigation was carried out during the period 2013-14 at the Agricultural Research Station, Sirsi which is situated in the North-West part of Karnataka. A light trap unit made up of galvanized iron sheet, comprising of two main components *i.e.* trapping device and collection-cum fumigation chamber to catch the trapped adult insect was used in the present study. Mercury vapor lamp (MVL) of 160 watts was used as light source for attracting adult population. Dichlorvos 76 EC was kept inside the fumigation chamber in plastic pocket/ bag to kill the trapped insects. The unit was installed at the Agricultural Research Station (Paddy), Sirsi, Uttara Kannada. The unit was operated every night from dusk to dawn. Eight sleeve pheromone traps per hectare were installed during cropping period at ARS, paddy and farmer's field. The scripolure containing 3 mg of (z)-11-hexadecinol and z-9-hexadecinol in ratio of 3:1 were used for the study. The lure was changed once in 15 days. The trapped adult insects were recorded daily. Sleeve traps height was maintained always at 30 cm above the crop canopy throughout the experimental period. The observations were recorded by collecting and counting the daily catches of yellow stem borer moths both in light and pheromone traps during the cropping season. The collection of each day samples was considered as a replication.

Correlation coefficient (r) was estimated by the formula given by Croxton and Cowden (1964) as:

$$r = \frac{n(\Sigma xy) - (\Sigma y)}{\sqrt{[n(\Sigma x^2 - (\Sigma x)^2][n(\Sigma y^2 - (\Sigma y)^2]}}$$

Where:

x= Independent variable (Climatic factors)

y= Dependent variable (Moth trapped)

n= No. of observations.

Population of yellow stem borer (YSB) moth through light trap per week catches ranged from 1 to 51 during 27 and 39th meteorological standard week. Peak catches of 51 moths was recorded during 38th and 39th meteorological standard week. However, higher moth catches was recorded during 34 to 38th meteorological standard week (39 to 51) (Table 1). Moth catches under light trap were initiated from 2nd week of July with 1.0/trap/week and showed increasing trends up to 40th meteorological standard week. These results are in conformity with Rai *et al.* (2002) who reported the maximum catches of YSB in light trap from September 1st till October. Population of YSB moth catches (male) in pheromone trap ranged from 0.37 to 9.75 and 0.25 to 8.50 during 26 and 38 meteorological standard week at the Agricultural Research Station (ARS), Paddy and farmer's field respectively. Peak catches of 9.75 and 8.50 moths was recorded during 38th meteorological standard week. However, higher moth catches was recorded during 34 to 38th meteorological standard week (5.62 to 9.75) and (5.00 to 8.50) (Table 2) in ARS and farmer's field respectively.

Studies on relationship of environmental parameters with population build up of YSB indicated that evening relative humidity (RH) (-0.56), (-0.59) and (-0.52) and rainfall (-0.57), (-0.51) and (-0.55) showed significant negative correlation with the population in light trapped moths at ARS, pheromone trapped moths at ARS and farmer's field respectively. Min. Temp. (0.21), (0.22) and (0.22), Max. Temp (0.25), (0.19) and (0.25)

Table 1. Monitoring of paddy yellow stem borer (YSB) through light and pheromone trap at Agricultural Research Station, Sirsi and farmer's field

Population of YSB (Numbers/trap)			
Meteorological Std. Week	Pheromone trap		Light trap
	Agricultural Research Station	Farmer's field	
22	00	00	00
23	00	00	00
24	00	00	00
25	00	00	00
26	0.37	0.25	00
27	0.50	0.37	1.0
28	1.25	0.87	3.0
29	1.37	1.37	2.0
30	1.62	1.75	6.0
31	2.37	2.00	10.0
32	3.25	2.87	10.0
33	4.25	3.87	28.0
34	5.62	5.00	39.0
35	7.37	6.62	41.0
36	8.00	7.37	47.0
37	9.37	8.12	46.0
38	9.75	8.50	51.0
39	9.50	8.00	51.0
40	7.25	7.00	46.0
41	6.62	6.25	29.0
42	1.87	1.37	13.0
43	0.87	0.50	7.0
44	00	00	3.0
45	00	00	00
46	00	00	00

Table 2. Correlation between light trap catches of yellow stem borer and weather parameters at Agricultural Research Station (ARS) Sirsi

Weather parameter	Correlation coefficient (r)		
	Light trap at AR	Pheromone Strap at ARS	Pheromone trap at farmer's field
Min. Temp. (°C)	0.21	0.22	0.22
Max. Temp. (°C)	0.25	0.19	0.25
Morning RH (%)	0.27	0.29	0.35
Evening RH (%)	-0.56*	-0.59*	-0.52*
Rainfall (mm)	-0.57*	-0.51*	-0.55*

*Significant @ p=<0.05

morning RH (0.27), (0.29) and (0.35) had non-significant positive correlation with the population in light trapped moths at ARS, pheromone trapped moths at ARS and farmer's field respectively (Table 2). Similar findings were also reported by David (1995) and Mishra *et al.* (2005) who reported positive and significant correlation with maximum temperature while relative humidity exerted a negative correlation with stem borer damage.

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